REMARKS

Favorable action on the above referenced application in consideration of this submission is respectfully requested.

The title of the invention was amended in order to be more aptly descriptive of the invention covered by the claims, in reply to the outstanding requirement.

In reply to the apparent missing Declaration in the USPTO copy of the file, as noted in Item 3, of the official action, attached hereto is a copy of the dated postcard receipt received from the USPTO Mail Room (OIPE), evidencing that an original Declaration was submitted as an attachment to a letter in reply to the Official Notice to File Missing Parts transmittal. Subsequently to the filing of the original Declaration, on December 30, 2002, a communication was received from the USPTO entitled, "*NOTICE OF ACCEPTANCE OF APPLICATION UNDER ...*," dated February 19, 2003, evidencing receipt of the items listed therein, one of which is the Oath or Declaration. As a courtesy to the Examiner, enclosed herewith is a copy of that paper along with a copy of the Declaration and Power of Attorney as filed on December 30, 2002, which are referred to in the postcard receipt.

The status of the claims are given hereinabove. By this amendment, independent claims 1, 2 and 5 were amended to further define the invention including in a manner which highlights various distinguishing aspects of applicants originally disclosed invention over that taught by the art cited in the outstanding rejection. The multiple dependent claims 9 and 10 were amended so that the alternative dependencies referring back to claims 1 and 2 were re-presented as separate dependent claims so as to be separated from the multiple claim dependency associated with the withdrawn claims 4, 6, 7 and 8. For example, the

portion of original multiple dependent claim 9 based on claim 1 or 2 was re-presented as new claims 17 and 18, respectively. Likewise, the portion of original multiple dependent claim 10 based on claim 1 or 2 was re-presented as new claims 19 and 20, respectively. Incidentally, the revisions implemented in withdrawn claim 4 are strictly of a grammatical nature.

New claim 21 (dependent on claim 1) was added for purposes of further highlighting various originally disclosed aspects of applicants improved semiconductor device. Namely, new claim 21 (dependent on claim 1) sets forth a "protective film" with an opening in a region in which "the land" (e.g., 5) is disposed, the protective film being formed on the conductive wiring (e.g., 4) and a portion of the projection (e.g., 6) is projected from a surface of the protective film. Examples of this are given in Figs. 1, 3, etc., although not limited thereto, in which the protective film 7 is formed on the conductive wiring 4 and has an opening where the "land" (e.g., 5) is disposed and, further, the projection 6 has a portion 6a that projects(i.e., protrudes) outwardly from the surface of the protective film 7. The independent claims 1, 2 and 5 were particularly amended to highlight the structural aspects directed to the "external terminals," the "lands" as well as the "projections." Specifically, the external terminals are now particularly characterized as being "solder bumps" such as shown by reference characters 8 in the drawings. Both the set forth "lands" (.e. g., 5) as well as the "projections" (e.g., 6) are now characterized as being made of a material comprising Copper (Cu).

Applicants note with appreciation the indication that the subject matter set forth according to claims 11-14 is considered allowable and that these claims would be formally allowed upon being re-presented in an appropriate self-contained format.

However, since applicants consider the invention according to claims 1+, 2+ and 5+ allowable, they consider it unnecessary, at this time, to re-present the objected to claims in an appropriate self-contained format.

According to the outstanding Office Action, claims 1, 2, 5, 9 and 10 were rejected under 35 USC §102 as anticipated by Osawa et al (USP 6,051,450). As will be shown hereinbelow, the invention according to claims 1+, 2+ and 5+ could not have been anticipated in the manner as that alleged in the outstanding rejection. Therefore, insofar as presently applicable, this rejection is traversed and reconsideration and withdrawal of the same is respectfully requested.

The present invention sets forth a semiconductor device scheme which is structured to reduce/suppress strain that is otherwise generated in an external terminal of the solder bump type resulting from differences in the coefficient of linear thermal expansion between the semiconductor device and a printed circuit board to which the semiconductor device is to be mounted. In this connection, the semiconductor device includes a semiconductor substrate formed with “pads” (e.g., 2 in Fig. 1(a)-1(b)); a “passivation film” (e.g., 3); "lands" (e.g., 5); “wiring lines” (e.g., 4) which connect respectively each pad to a corresponding land; an “insulating film” (insulating protective film 7, 7a and 7, 7a and 15); and “external terminals” which are solder bumps (e.g., 8). Examples of these are given in Figs. 1, 3, 5, 7, etc. of the drawings and are discussed extensively in the original Specification.

When mounting a semiconductor device, via the solder bumps thereof, on a printed circuit board, changes in temperature may lead to deformation of the solder bumps. However, the present invention such as set forth in each of independent claims 1, 2 and 5, and further according to the corresponding dependent claims

thereof suppresses strains which may lead to deformation of the solder bumps. This is because the propensity for deformation of the solder bumps is suppressed by having both the projections as well as the lands of the semiconductor device contain Copper (Cu). Material containing Copper (Cu) enhances the rigidity of the components which use it, for example, the "lands" (e.g., 5) and projections (e.g., 6). Since the lands and the solder bumps are connected via projections containing Cu, distortion of the external terminals, which are solder bumps, in the bonding area on the semiconductor side is restricted . (Page 8, line 6, *et seq.* of the Specification.) Accordingly, thermal distortion resulting in the solder bump can be decreased. The semiconductor device according to each of independent claims 1, 2 and 5 includes a scheme in which the external terminals are solder bumps, and the lands as well as the projections are formed of material comprising Copper (Cu). It is submitted, the schemed semiconductor device according to claims 1+, 2+ and 5+, calling for the formation of pads on a semiconductor substrate, a passivation film, lands and conductive wiring lines as well as insulating films such as the protective insulating film 7, 7a, in which example embodiments thereof are shown in Figs. 1, 3, 5, etc. , although not limited thereto, was neither disclosed nor could have been realizable from Osawa et al's disclosure.

Osawa et al's scheme is particularly directed to the particular placement of the bump electrodes and to ensuring satisfactory bonding. Osawa et al, it is submitted, did not disclose nor suggest implementing a Cu projection such as that called for in each of independent claims 1, 2, and 5. According to claim 1, for example, "projections made of a material comprising Cu, are formed on each of said lands at positions where said lands are connected to the external terminals." In other words,

according to the present invention, the Cu projections are formed on the Cu land and are bonded to the external terminals which are solder bumps. According to Osawa et al, the solder balls 11 are formed on the surface of circuit wirings 7 which are exposed through the openings 9 and the material employed for the solder balls consists of a plurality of components. (Column 7, lines 39-44, of Osawa et al.) Osawa et al, however, neither disclosed nor suggested a scheme in which the easily-deformable solder balls, which are comprised in a manner as that discussed in column 7, lines 40-44, thereof, are formed on Cu projections that are, in turn, formed on the Cu lands, respectively, consistent with that presently set forth in each of claims 1+, 2+ and 5+. As a result therefor, both operation and effect resulting from the schemed invention as that now set forth could not have been achievable according to Osawa et al. For at least the above reasons, the invention according to claims 1+, 2+ and 5+ could not have been anticipated nor, for that matter, rendered obvious from Osawa et al.

Therefore, in view of the Amendments presented hereinabove together with these accompanying remarks, reconsideration and withdrawal of the outstanding objection/rejection as well as a favorable action on all of the pending claims and an early formal notification of allowability of the above-identified application is respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37

CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to the Antonelli, Terry, Stout & Kraus, LLP Deposit Account No. 01-2135 (Docket No. 500.39915X00), and please credit any excess fees to such Deposit Account.

Respectfully submitted,
ANTONELLI, TERRY, STOUT & KRAUS, LLP

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Attachments: (1) Copy of December 30, 2003 UPSTO-dated receipt
(2) Copy of USPTO paper entitled, " *NOTICE OF ACCEPTANCE OF APPLICATION UNDER ...*,"
(3) Copy of originally-filed Declaration and Power of Attorney